OCTOBER 3, 1983

CHEMICAL & ENGINEERING

NEWS

Dow's Oreffice looks ahead to 1984
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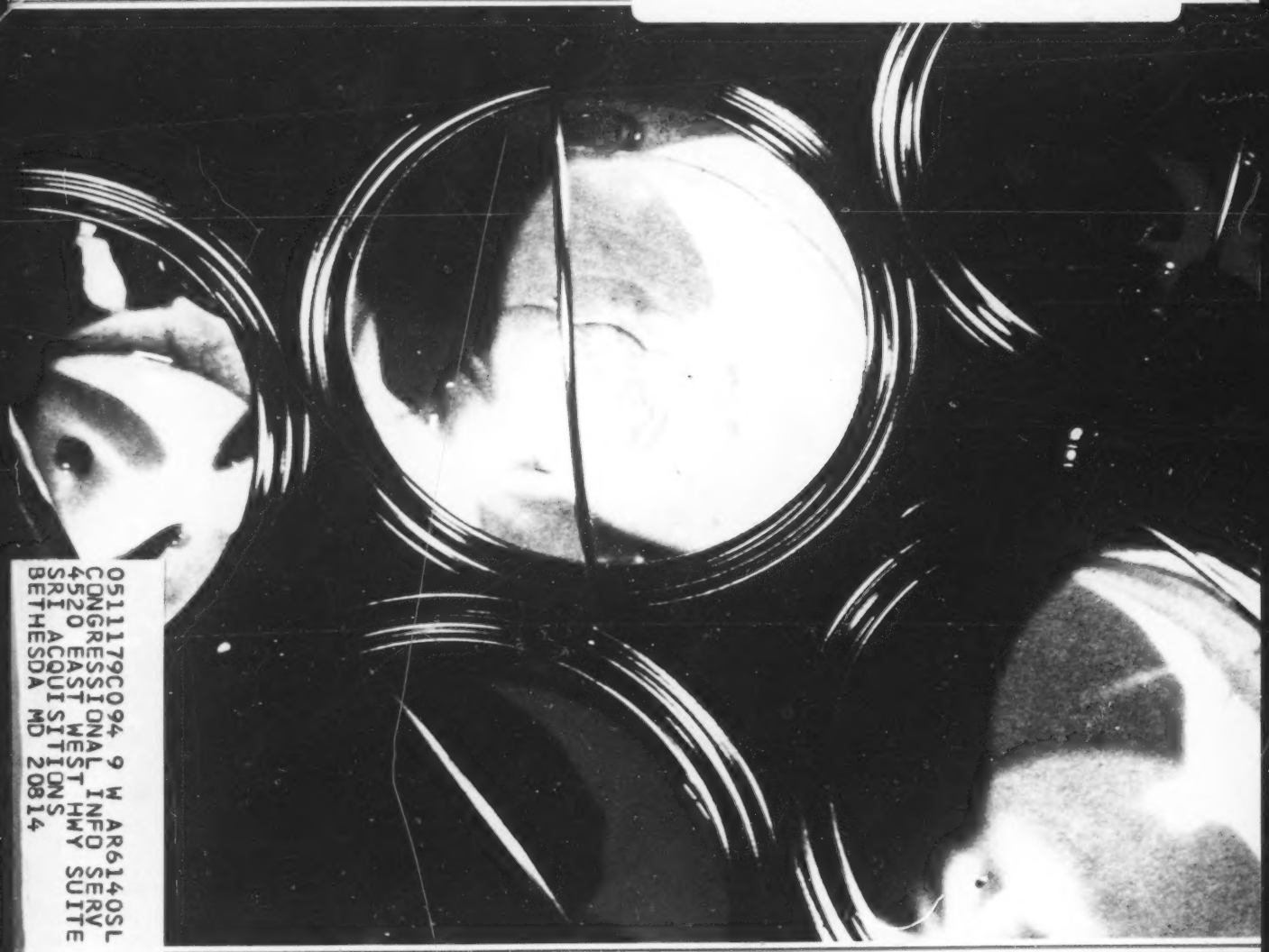

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Paint industry recovers recession's losses
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Cover: Photo courtesy of Glidden Coatings & Resins division of SCM

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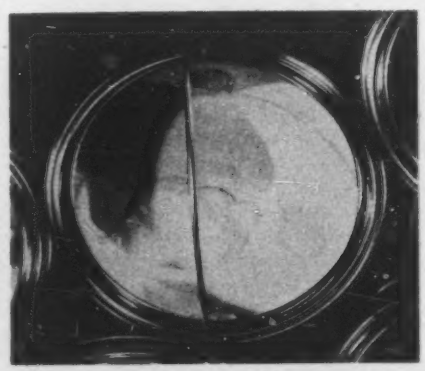


Paint Report

Rise in production of paints, coatings is due to increased housing starts, auto output, and consumer use. **Page 25**

Operation of Defense's Science Advisory Boards Aired in Hearings

House panel discusses two reports questioning boards' compliance with governing policies, operating procedures, and legal requirements

The House Government Operations Subcommittee on Legislation & National Security held hearings late last month on what chairman Jack Brooks (D.-Tex.) called the "very serious and disturbing findings" of two reports on the operations of science advisory boards of the Department of Defense.

The first report, which was issued in July by DOD Inspector General Joseph H. Sherick, concluded that the Defense Science Board's compliance with governing policies, operating procedures, and legal requirements was clearly inadequate and that lack of documentation concerning DSB task force meetings left the objectivity of its recommendations open to question (C&EN, Aug. 22, page 15).

The second report, released at the hearings, was prepared by the General Accounting Office and concerned the operations of the Army Science Board, the Air Force Scientific Advisory Board, and the Naval Research Advisory Board. GAO found that "the services do not always follow appropriate procedures in the operations of the scientific advisory committees."

The three committees conduct their work primarily through panels—usually created for one year or less. Each panel performs a specific task or undertakes a specific study. In reviewing the financial disclosure statements of 117 panel members, GAO found that 32, or about 27%, were employed by or had financial interests in organizations with contracts in areas that could be affected by panel recommendations, GAO head Charles A. Bowsher told the subcommittee.

Further, Bowsher said that whereas the Federal Advisory Committee Act requires that panel membership be fairly balanced in terms of representative points of view, the DOD directive which implements the act does not address the issue of balance at all. The lack of documentation of the steps taken by the Army and the Air Force in the selection of panel members, the direct involvement of DOD personnel in panel decision making, and noncompliance with procedures for meeting announcements and minutes could lead to questions about the objectivity of the Army and Air Force panels, GAO charges.

The operating procedures of the Naval Research Advisory Committee also could lead to questions concerning the objectivity of its panels, GAO says. However, its panel members do not have to file financial disclosure statements because the Navy considers them to be employees of Catholic University, Washington, D.C., which is under contract to provide support for the research advisory committee's studies. That also means that notices of panel meetings do not have to be published in the *Federal Register* and minutes of the meetings do not have to be taken.

Asked to investigate charges that the science panels were essentially an "old boy network," GAO analyzed the panel's five-year membership to determine if the same organizations continually provide individuals to serve on panels. During that period a total of 1223 assignments were filled by 1049 individuals—representing 209 employers. The two largest categories of panel members were either self-employed consultants (140) or DOD employees (115). Twenty-six employers provided individuals to fill five or more positions in at least one of the five years. Twelve of the employers pro-

Top 12 contributors to DOD science panels

Panel members	1982	1981	1980	1979	1978	TOTAL
Aerospace Corp.	2	10	6	6	3	27
Boeing	6	2	6	4	5	23
Honeywell	5	5	6	2	2	20
Hughes Aircraft	8	8	4	3	2	25
Lawrence Livermore National Laboratory (U of California)	1	7	10	5	3	26
Lincoln Laboratories (MIT)	3	8	10	4	2	27
Massachusetts Institute of Technology	5	8	4	12	5	34
Mitre Corp.	6	3	3	5	3	20
National Aeronautics & Space Administration	7	5	6	9	4	31
R&D Associates	8	12	6	8	11	45
University of California	5	7	4	7	4	27
Department of Defense	32	16	32	26	9	115

Source: General Accounting Office

vided individuals to fill 20 or more positions over the five-year period.

Bowsher was most concerned about the participation of military personnel in committee activities. He pointed out that "since panels are established to provide independent advice, the use of military personnel in panel decision-making could lead to questions about how independent such advice is." He suggested that military personnel serve only as advisers or briefers instead of being participants in panel decisions.

Although the GAO report on the three service committees has just come out, DOD has had time to make "substantial improvements" in the operations of the Defense Science Board, according to DOD Inspector General Sherick. He told the subcommittee that financial disclosure statements are being processed, in most cases, in advance of panel members' attending their first meetings. An "ethics counselor" has been appointed to work closely with DSB to ensure that financial interest reviews are complete. Advance notices of all meetings are now being published in the *Federal Register*. Minutes are being taken at each meeting.

The most important outcome of the report, Sherick says, is that a master list of potential task force members is being drawn up. "The concept of such a list is a major improvement over past practices and complies with our recommendations to broaden the universe from which task force members are selected. This is a good start," he told the subcommittee. But he expressed concern over a recent followup review of DSB practices that showed that of 26 consultants on three task forces, only six individuals had not participated on a task force included in the first review and only four were selected from the master list. "I envision a list of at least 1000 names selected from, and recommended by, many diverse disciplines and organizations. I also believe that a continuing effort will be needed throughout the life of the board to ensure that the broadest range of expertise is always available and the list is current. More important, the list must be used as the primary source of task force members," he said.

Janice Long, Washington

GAO exposes maze of air hazard regulations

It is no secret that the Environmental Protection Agency takes a long time to decide on new regulations and that it often has failed to meet the deadlines set by Congress in the various environmental laws. Now, in one of the longest documentations ever of this problem, the General Accounting Office has released a report on the tortuous path the agency follows in regulating hazardous air pollutants.

The GAO review was requested by Rep. John D. Dingell (D.-Mich.), chairman of the Energy & Commerce Subcommittee on Oversight & Investigations. GAO was to find out why it is taking EPA so long to promulgate any rules on new air hazards. It found a maze of review committees, subcommittee panels, and EPA offices all partly responsible for getting out the regulations.

Basically, under the Clean Air Act, section 112, EPA is required to develop standards on any hazardous air pollutants that are not covered by other parts of the law. When a substance is suspected of being a health hazard, EPA prepares a health assessment document that is, by agency policy, approved by the agency's scientific advisory board. When a hazard has been identified, the substance is "listed" as such by EPA. The agency then has 180 days to propose an emissions standard for that substance and must publish a final standard 180 days after the proposed standard. EPA has generally failed to do all of these things.

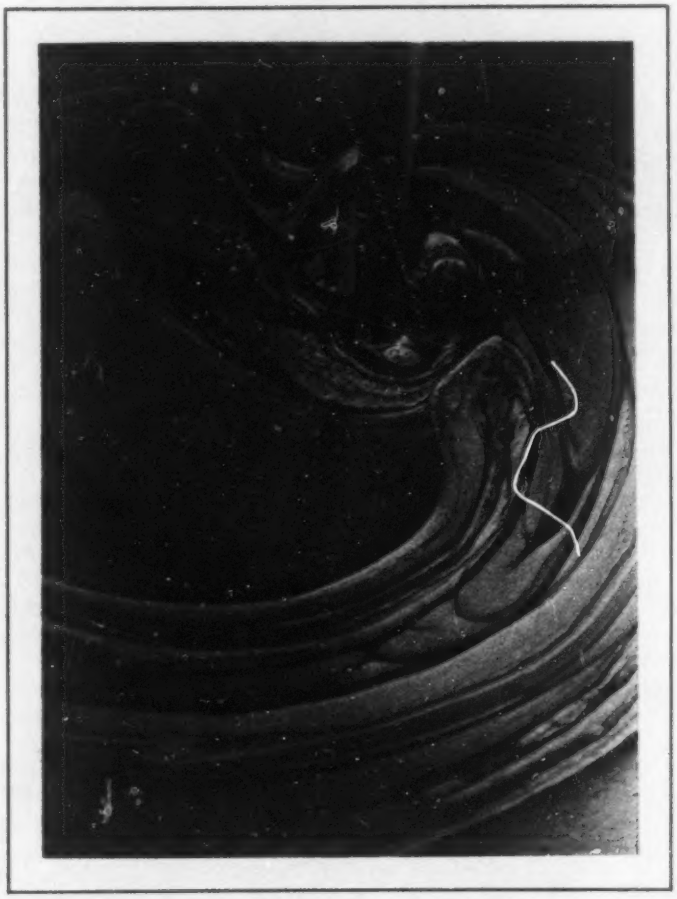
A brief study conducted in 1976 by a contractor listed 632 chemicals that might be possible hazardous air pollutants. By 1977, EPA had cut that list to 43 and eventually ended up with a priority list of 37 potentially hazardous air pollutants. This list has been updated, revised, massaged, cleaned up, and corrected several times since it first appeared, but action on the substances has not come smoothly. EPA has listed only seven compounds as hazardous and promulgated regulations on just four of those. The agency is developing health assessment and standards for another 37 compounds. GAO finds a number of reasons for this sad state of affairs.

Constant policy shifts by various EPA administrators on just what kind of data and peer review are needed for the health assessment documents are the major problem. Work done by the two main offices at the agency, the Office of Air Quality Planning & Standards and the Office of Health & Environmental Assessment, has been jerked around at different times by the addition of new layers of review or by having new deadlines forced on them by lawsuits. The science advisory board is also blamed for some of the delay. It has criticized EPA's methods of assessing hazards and the agency has been slow in making the recommended changes.

GAO claims it is the health assessment document that is the critical problem. The report says that assessments on 19 of the 37 chemicals have been started, but the advisory board has approved only two. EPA claims it takes up to 30 months to get an assessment completed, making a joke of the 180-day deadlines for proposed rules set in the law. Also, delays in getting the assessment documents finished because of lengthy internal reviews have meant that reports containing outdated information have gone to the science board for approval, causing EPA to spend more time and money updating the documents when they weren't approved.

But even when the science board has approved an assessment, EPA hasn't moved. For instance, an assessment of cadmium was approved in 1978, but EPA has yet to propose an emission standard. Toluene's assessment was approved by the board in May 1983, yet EPA has held up action on a standard.

GAO acknowledges that EPA is making an attempt to straighten out the tangled system now in place for evaluating and regulating hazardous air pollutants, but makes no prediction on whether that effort will be successful. Without more resources and relief from the constant barrage of lawsuits that force personnel to leave ongoing projects in order to meet court-ordered deadlines, it seems unlikely the process can ever be significantly faster. □



Paint Industry Recovers from Recession's Losses

William J. Storck
C&EN New York

Paint and coatings manufacturers are having it their own way this summer.

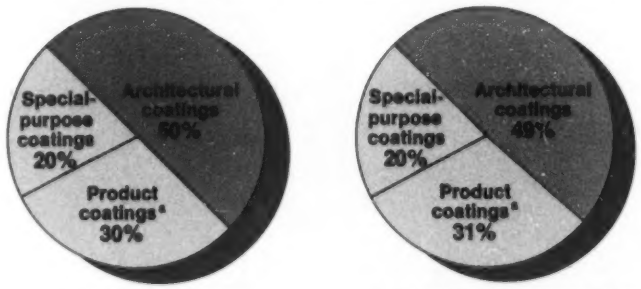
A combination of increased housing starts, rising automobile output, and expanding use by consumers to repaint both the exteriors and interiors of existing houses has served to increase production of paints and coatings dramatically.

According to seasonally adjusted figures from the Commerce Department, production of paints and coatings increased more than 68% between January and June this year, when output reached 97.4 million gal. (Baseline data from the Commerce Department were revamped in January so that comparison with earlier years is not possible.)

The value of manufacturers' shipments didn't quite keep up with production, but it also rose healthily through the first six months of 1983. According to the Commerce Department, this value increased almost 65% between January and June to a seasonally adjusted $854 million.

However, business for paint makers is not always this good. The paint industry is a mature and cyclical business made up of an estimated 1000 manufacturers. Thus, in good times output grows slowly, but in bad times it drops precipitously. For instance, in the years before the current recession, the industry's production grew at an average annual rate of 2 to 3%. Then when the

Architectural coatings half of production, value in 1982



Total production = 903 million gal

Total value of shipments = $8.3 billion

a Original equipment manufacturers. **Source:** Department of Commerce

downturn came, the paint industry as a whole really got socked. Production of paints and coatings, according to government figures, between 1979 and 1982 fell almost 16% to 903 million gal.

Leading the decline were the two main categories of paints—architectural coatings and product coatings, including paint for new autos (so-called original equipment manufacturers or OEM). Production of architectural coatings dropped 21% from 1979 to about 454 million gal in 1982. And product coatings-OEM production declined 19% during that period to 269 million gal in 1982 as production of automobiles hit the skids.

However, not everything was gloomy for the industry during the recession. Special-purpose coatings did reasonably well, with output increasing 8.8% during the period to 180 million gal.

But in spite of the recession and the accompanying downturn in paint production, the value of paint and coatings shipments has increased every year unabated. The value of shipments for all paints and coatings between 1979 and 1982 rose more than 18% to $8.3 billion last year.

Again, special-purpose coatings led the pack with shipments value increasing about 29% from 1979 to $1.7 billion in 1982. Architectural coatings' value rose 18% to $4.05 billion. And the value of product coatings-OEM increased nearly 12% to $2.55 billion.

However, even paint manufacturers themselves do not expect these good times to last long, before paint returns to its more traditional growth patterns. They seem to think that what, since the early days of the recession, has been typified by economists as "pentup demand" probably has just about gone through the system, and paint customers probably will return to normal buying patterns within the next year.

Then, too, for architectural coatings, pentup paint demand, at least on the level of maintenance of older houses, just didn't materialize. According to Robert A. Katherine, chairman of Philadelphia-based McCloskey Varnish Co., many home owners were forced to take two-week layoffs in 1980 and they took the opportunity to repaint their houses. Thus, architectural coatings went into the recession with at least one strike against them—at least some of the houses that would have been painted during the next two or three years already had been done.

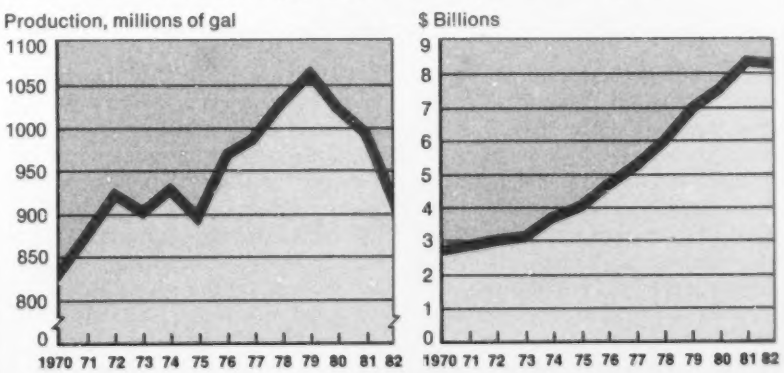
Consequently, architectural coatings demand took a nosedive during the recession. Between 1979 and 1982, shipments of architectural coatings declined 20.4% to 455 million gal. Production dropped 7.3% in 1980, 4.6% in 1981, and 9.9% last year, according to data from the Department of Commerce.

However, in spite of the more than 20% fall in shipments, the value of architectural coatings shipments continued to grow throughout the recession. According to Commerce Department figures, the shipments value of these coatings increased 18.4% between 1979 and 1982. Between 1979 and 1980, shipments value rose 9.3% to $3.64 billion. In 1981 it went up 9.1% to $3.97 billion and, in spite of a very poor economy, continued up 2.0% in 1982 to $4.05 billion.

This means that the value per gallon shipped over the period rose 49.1% to $8.92. The largest increase was between 1980 and 1981, when the value per gallon climbed 20.2% to $7.86. Between 1981 and 1982, the value per gallon increased another 13.5% to $8.92.

Industry managers also worry that federal budget deficits are going to lead to higher interest rates that very easily could slow new housing construction once again, thus causing yet another slowdown in

Paint production growth peaked in 1979, but dollar value has been growing 10% per year for the past decade



Source: Department of Commerce

demand for paints for this market. Also, this once again could affect sales to the automotive industry as higher interest rates drive down demand for new autos.

One thing that producers of architectural coatings have going for them now, other than the upswing in the economy, is the changing taste of the consumer. According to McCloskey's Katherine, right now the trend is toward a more natural look and feel in housing. Thus, purchasers of materials for exterior use are trending away from such things as vinyl siding and aluminum siding and are using paint more. Although this is aiding paint sales at present, it is just as likely that sometime in the future the pendulum will swing again and competing materials once more will eat into traditional paint areas.

One consulting firm that also believes that this trend to a more natural look in housing is probably transitory is Business Trend Analysts, a market research company based in Commack, N.Y. A spokesman for the firm says that with the economy in what is believed to be a sustained period of growth, consumer demand for paint likely will improve as home owners begin maintenance projects that they had put off. The firm projects that sales of architectural coatings in 1983 will increase about 14% to about $3.6 billion.

However, the firm says, over the long-term the interior paint market presents better growth opportunities than the market for exterior paints. Exterior paints, Business Trend says, will face increased competition from aluminum and polyvinyl chloride sidings, as well as continued low rates of housing starts

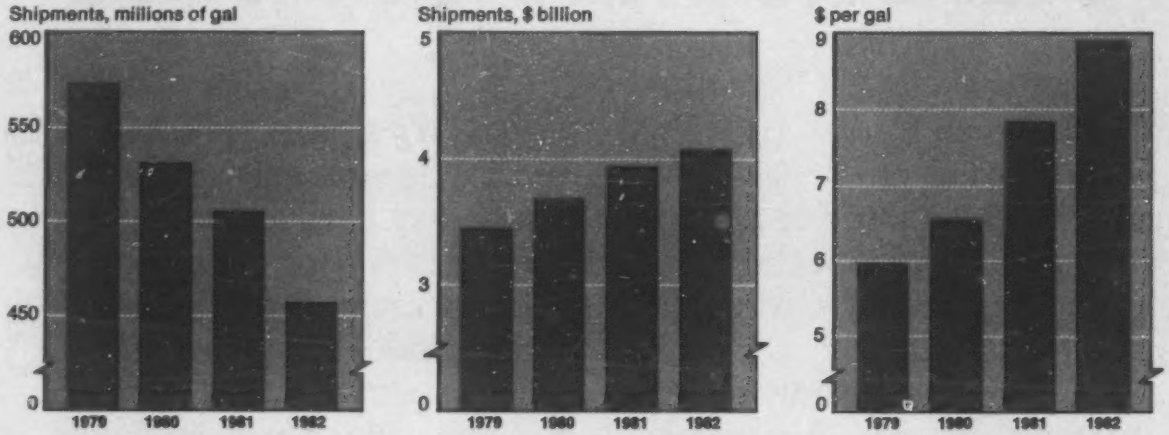
U.S. paint resin producers cover extensive range

Resins	Major producers		
	Captive	Merchant	Merchant and captive
Acrylic	Cook Industrial Coatings, De Soto, Dexter, Grow Group, Inmont, Lilly Industrial Coatings, Mobil, PPG Industries, SCM, Sherwin-Williams		Ashland Chemical, Celanese, Cook Paint & Varnish, Du Pont, H. B. Fuller, Inmont, Reichhold Chemicals, Rohm & Haas, SCM, Union Carbide, Valspar
Alkyd	Beatrice Foods, De Soto, Du Pont, General Electric, Inmont, Lilly Industrial Coatings, Mobil, Benjamin Moore, O'Brien, PPG Industries, SCM, Sherwin-Williams, Whittaker		Cargill, Celanese, Cook Paint & Varnish, McCloskey Varnish, Reichhold Chemicals, Reliance Universal, Spencer-Kellogg
Amino		American Cyanamid, Koppers, Monsanto, Reichhold Chemicals, Rohm & Haas	
Epoxy			
Modified coating	Allied Products, Cook Industrial Coatings, Cook Paint & Varnish, De Soto, Dexter, Guardsman Chemicals, Inmont, McCloskey Varnish, Mobil, M&T Chemicals, O'Brien, PPG Industries, Pratt & Lambert, Schenactady Chemicals, SCM, Sherwin-Williams, Valspar, Westinghouse	AZS, Cargill, Reichhold Chemicals, Spencer-Kellogg	
Unmodified coating			Celanese, Ciba-Geigy, Dow Chemical, Reichhold Chemicals, Shell Oil, Union Carbide
Urethane	De Soto, Du Pont, Inmont, Mobil, Norris Paint, Olin, PPG Industries, Pratt & Lambert, SCM, Sherwin-Williams	ADCO Chemicals, BASF Wyandotte, Beatrice Foods, Cargill, CasChem, Cook Paint & Varnish, Dexter, B. F. Goodrich, Grow Group, Mobay, Morton Thiokol, Polychrome, Reichhold Chemicals, H. H. Robertson, Spencer-Kellogg, Union Carbide, Valspar, Witco Chemical	
Vinyl			
Polyvinyl acetate coating	Bennett's, De Soto, Foy Johnson, Insilco, Kelly-Moore Paint, Benjamin Moore, Norton & Son, O'Brien, PPG Industries, SCM	ADCO Chemical, Air Products, Borden, H. B. Fuller, W. R. Grace, Jones-Blair, McCloskey Varnish, Monsanto, National Starch & Chemical, Reichhold Chemicals, StanChem, Union Carbide, Union Oil, Valspar, Yenkin Majestic Paint	
Polyvinyl chloride coating		Borden, B. F. Goodrich, Occidental Petroleum, Union Carbide	

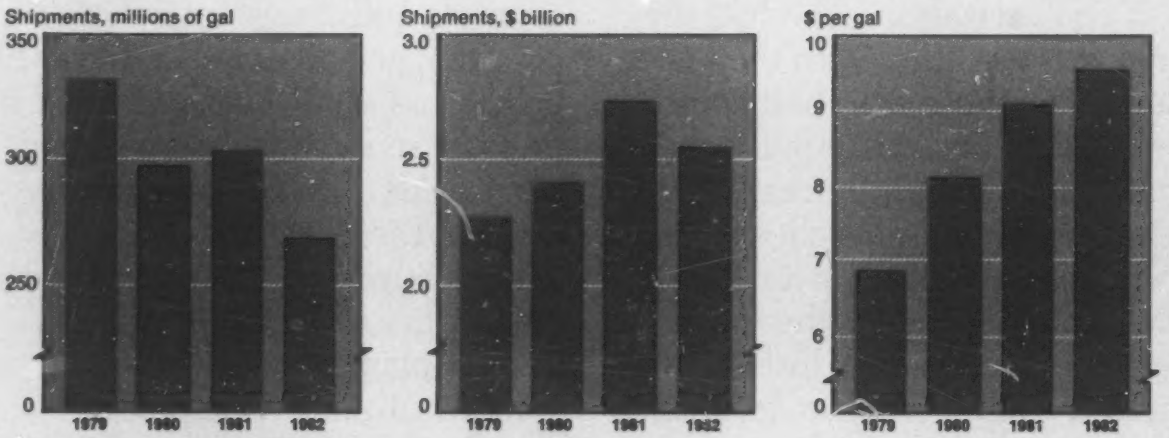
Sources: Charles H. Kline & Co., SRI International

Although shipments have fallen, value of paints keeps rising

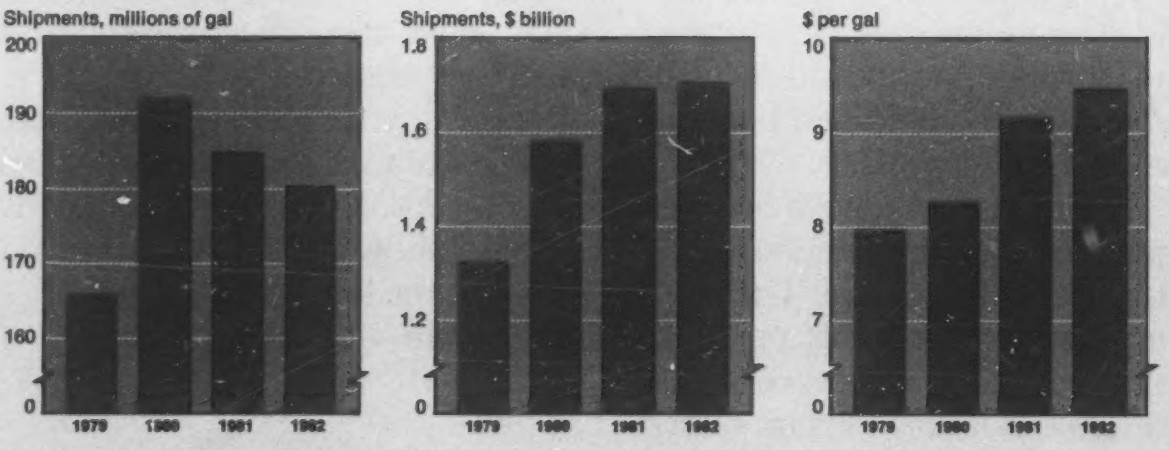
Architectural coatings



Product coatings[a]



Special-purpose coatings



a Original equipment manufacturers. Source: Department of Commerce

Main paint pigments come from diverse group of producers

Pigments	Major producers
WHITE	
Titanium dioxide	American Cyanamid, Du Pont, Kerr-McGee, SCM
Zinc oxide	ASARCO, Fluor, Gulf + Western
COLOR	
Carbon black	Ashland Oil, Cabot Corp., Consolidated Mining & Industries, Du Pont, J. M. Huber, Phillips Petroleum, Sid Richardson Carbon
Iron oxide (black)	Foote Mineral, Mobay, Pfizer, Rockwood Industries
(brown)	Mobay, Pfizer
(red)	Mobay, Pfizer
(yellow)	Mobay, Occidental Petroleum, Pfizer, Rockwood Industries
Lead chromate	Ciba-Geigy, Hydrite Chemical, National Industrial Chemical, Rockwood Industries
EXTENDER & FILLER	
Barium sulfate	Clark & Davies, Thompson, Weinman, Whittaker
Calcium carbonate	H. T. Campbell, Georgia Marble, Manville, Pfizer, Thompson, Weinman
Diatomite	Grefco
Kaolin	Burgess Pigment, Engelhard, Georgia Kaolin
Mica	English Mica, Franklin Mineral Products, General Electric, C. P. Hall
Silica	Illinois Minerals, Malvern Minerals, Tammsco

Sources: Charles H. Kline & Co., SRI International

over the next decade. According to the firm, sales of interior paints will grow at an average rate of about 6.7% per year through 1992, reaching about $2.8 billion in that year. Exterior paint sales, on the other hand, will grow at a lower annual rate of about 5.7% per year, reaching $2.4 billion in 1992.

In fact, even this year, most industry sources C&EN talked with say that interior maintenance seems to be more important to the architectural coatings recovery than is the exterior paint market.

Frost & Sullivan, a New York City-based market research firm, says that between 1982 and 1987, physical volume sales of interior paints will grow about 13%, more than the 11% or so increase forecast for exterior paints over the same period.

The consulting firm says that the fastest growth will be for interior water-based paints, which it expects to grow almost 20% during the period. Frost & Sullivan says that sales of interior solvent-based paints probably will drop about 8% between 1982 and 1987. At the same time, water-based exterior paint sales probably will rise about 16%, with a 2.9% growth for solvent-based exterior paints.

The firm says that growth of solvent-based paints is declining because of government regulations that "have stimulated the industry to develop and produce acceptable water-based paints." The result of the shift is that water-based paints will increase their market share to almost 76% in 1987 from 69% in 1982.

In a survey of retailers, Frost & Sullivan found that they were generally optimistic about paint sales in 1983 and 1984. General merchandise stores and do-it-yourself home centers were the most bullish. The retailers indicated that interior water-based products will continue to be the top-selling products, providing the greatest profit potential for retailers, and providing the best promotional possibilities. Exterior water-based paints ranked second. However, the firm found only minimal gross profit margins for both regular-priced and sale-priced paints.

Concerning past performance not only of paint but of wallpaper and other interior decorating products, the firm says that the consumer has had a limited amount of income to spend on home improvements, and the income normally expended on home decorating projects in recent years has been diverted substantially to energy conservation projects. But because energy improvements are "once in a lifetime projects," consumers probably will be returning to decorating efforts, according to Frost & Sullivan.

The market research company concludes that the improving economic situation likely will help the paint industry post some modest gains in 1984 and beyond, but prospects for major improvements in physical volume growth rates or in profit potential remain slim.

There seems to be at least one other huge impediment to the paint market, and that is the marketing scheme itself for architectural coatings. According to industry sources, the retail market for paint to maintain houses is much more important to them than is the market for paint for new housing. And this paint aftermarket is dominated by some very large outlets that, producers say, will not allow paint prices to rise enough to bring paint margins to the point where they would justify R&D and reinvestment. They say, in particular, that Sears, with its vast number of retail outlets, can pretty much dictate what the price of all paints will be to the consumer. Sources in the do-it-yourself home center industry admit that paints normally are used as loss leaders in their stores to entice customers into the outlets so they will purchase other products. One person in the home center industry says, "We feel that if we can get a woman to bring her husband into a store to buy paint, he will probably buy other items where the markup is better."

Add to this the huge number of producers which make the industry highly competitive and it becomes apparent that low margins are the norm in the paint industry, especially in architectural coatings.

However, in the architectural coatings area, there is a fairly sizable market for maintenance. This is not true in the product coatings-OEM segment of the paint industry where most of the products are original finishes for major durable goods. Consequently, this segment of the industry is even more cyclical than is architectural coatings.

Product finishes are formulated specifically to manufacturers' specifications for products and for methods of application. This includes not only paint, but powders and also lacquers, which go mainly to the wood furniture markets. According to Charles H. Kline & Co., Fairfield, N.J., there are few standard lines of product coatings. The technology is usually proprietary and it is frequently highly sophisticated, especially in the area of automotive and appliance finishes where durability as well as appearance is important.

In the past, solvent systems have dominated the product coatings segment. However, because of environmental and safety regulations, waterborne and other solventless systems likely will take over the lead.

Since product finishes are used for coatings in such highly cyclical durable goods markets as automobiles, boats, aircraft, furniture, and appliances, demand in this segment of the paint market will grow no more than 3% per year in the next several years, according to SRI International, a research firm based in Menlo Park, Calif. Others say that it will pretty much grow at the same rate as the gross national product of the U.S.

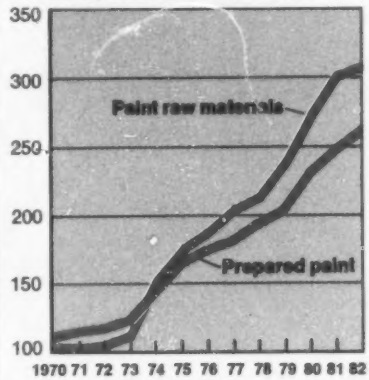
In the past four years, product finishes have had an especially rocky road. Between 1979 and 1982 shipments fell 19% to about 269 million gal, according to government figures. However, it was anything but a straight line decline. From 1979 to 1980, shipments fell 10%, then climbed 1.4% in 1981, and fell another 11% in 1982.

However, the shipments value throughout the period climbed steadily until 1981, then fell in 1982. Between 1979 and 1981, the value of shipments increased 20% to $2.74 billion. But in 1982, shipments value dropped 7.3% to $2.54 billion.

The one thing that did not stop growing during the period was the price of paint. The value per gallon shipped was $6.88 in 1979 and climbed to $9.46 by 1982.

According to Kline, metal finish coatings is the biggest segment of the product coatings market, accounting for about one third of the market. This is followed by automotive and wood finishes, each of which takes about 25% of product coatings production.

Raw material prices have outstripped paint prices



Source: Department of Labor

Kline indicates that there is one other aspect militating against product growth in this area of the paint industry—waste. The efficiency of paint application is extremely important, according to Kline. Currently, the firm says, most of the paint or lacquer used as product finishes is sprayed on. This method has a loss factor of 60 to 65%. This loss factor can be lessened by new forms of application such as electrostatic systems, electrodipping, or using powder systems. However, this elimination of waste will offset any real growth in this industry segment.

The third major area in the paint industry, special-purpose coatings, has applications in new industrial construction and maintenance coatings, traffic paints, automobile refinishes, and metallic finishes. This group also includes aerosol paints. Industrial construction and maintenance is the biggest use, followed by automotive and machinery refinishes.

According to Kline, special-purpose paints and coatings are formulated for special uses or environmental conditions. These include extreme temperatures, chemicals, fumes, and other conditions.

According to government figures, shipments of special-purpose coatings peaked in 1980 at more than 191 million gal, a nearly 16% increase from 1979. In 1981, shipments declined 3.8% to about 184 million gal, followed by a 2.3% decrease in 1982 to 180 million gal.

Again, though, in value of shipments special-purpose coatings continued to increase, even though the increase between 1981 and 1982 was almost negligible. According to Commerce Department figures, in 1980 the shipments value increased about 20% from 1979 to $1.58 billion. They then rose another 7% in 1981 to $1.69 billion, followed by a less than 1% rise in 1982 to $1.7 billion.

Special-purpose coatings were the worst of the three paint industry segments between 1979 and 1982 in terms of value per gallon shipped. Although increasing every year, this unit value managed only an 18% increase for the four years, compared with a 49% increase for architectural coatings and a 38% increase for product coatings-OEM. In 1980, the value per gallon shipped was $8.24 for special-purpose coatings, up 3.1% from 1979. In 1981, the value per gallon climbed 11% to $9.17, followed by a 2.9% increase in 1982 to $9.44.

In spite of the problems of special-purpose coatings in recent years, Business Trends Analysts sees this area as the fastest-growing paint industry segment in the future. The market research firm says that sales will increase nearly 14% in 1983, and that long-term sales growth will average slightly more than 8% per year, bringing sales to about $3.4 billion by 1992.

A big problem for paint producers is that raw material prices have risen much faster than have the paint prices themselves, thus shrinking margins within the industry. According to data from the Labor Department, since 1970 the producer price index for prepared paints has increased 134%, or at an average annual rate of 7.3%, to 263.1 (1967 = 100) in 1982. During the same time, the producer price index for paint raw materials has risen 200% to 304.6, for an average annual growth rate of 9.6%. Much of the raw material price increases resulted from the energy problems of the mid-1970s, because most of paint's raw materials are based on petrochemicals. □